SPECIAL FEATURE

Passive smoking and young children's health

Robert Moorhead

Recent international studies have been documented which suggest a link between passive smoking and disease in young children. They include studies of passive smoking and its relationship to pneumonia and bronchitis,[1, 2] respiratory disease,[3] restricted activity due to acute respiratory disease,[4] increased winter admissions[5] and increased visits to doctors.[6] This article is based on a general practice study in this area.

The aim of this study was to see if children of smoking parents have different morbidity patterns in their visits to a general practitioner. The 24 categories of health problems studied are as follows:

- Total consultations
- Total diagnoses (all diagnoses were by encounter)
- Winter consultations
- Spring consultations
- Summer consultations
- Autumn consultations
- Respiratory diagnoses
- Preventive classification diagnosis
- Nervous and sense organ diagnoses
- Skin diagnoses
- Trauma diagnoses
- Upper respiratory tract infection and pharyngitis
- Tonsillitis diagnoses
- Wheezing — patient initiated diagnoses
- Wheezing — total diagnoses
- Vaccinations
- Gastroenteritis diagnoses
- Rubella diagnoses
- Scarlet fever diagnoses
- Modified pertussis diagnoses
- Conjunctivitis diagnoses
- Otitis media diagnoses
- Hospital admission — number of days
- Infectious disease diagnoses.

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The study began on 1 January 1979 and ran for 18 months. Regular attenders of the author's practice were selected because some families used more than one doctor. This ensured that subsequent morbidity was being presented to the recorder only. All practice records were studied and families were selected, with married parents (under 45 years of age), in which every member had attended the practice at least once in the past two years. From this group of families 170 children, from newborn to the age of five years, were identified. Their parents' smoking habits had been recorded previously and the children were divided into two groups: one or both parents smoking; or neither smoking.

Families were matched for age, sex, social class[7] and size (greater than two, or two or less children) using punch cards. As with all matching procedures, not all children could be matched so the study started with 106 children — 53 in each group. This was a non randomised cohort study.

The morbidity recorded fulfilled the definitions in the International Classification of Health Problems in Primary Care (ICHPPC).[8] The diagnoses were studied according to age group.

The practice after hours work is performed by a locum service run by the principals and a written report was available on such diagnoses. All inpatient hospital records for patients in this survey were studied by the author and the number of days in hospital recorded. Home visits, after hours visits and consultations were included in the survey.

There were two outcomes measured in the study. One was the chi-square on the 24 items of morbidity for both groups, which was calculated by computer. The other was the mean of the diagnoses for the smoking and non smoking group.

The smoking group children attended more frequently, had more diagnoses per consultation and spent more days in hospital.

Table 1 shows the common diagnoses for the two groups and the predominance in the smoking group for certain diagnoses. In *Table 2* less common diagnoses and other health problems are recorded. There was a similar finding for total wheezing (initial and doctor requested follow up). Days in ACT hospitals were defined as the calendar difference between dates of admission and final discharge, midnight to midnight.[9] The mean of the number of days spent in hospital by those in the smoking group was nearly double that of those in the non smoking group. It is interesting that more vaccinations were performed for the smoking group.

Not every rubric studied produced a greater number of diagnoses for the children of smoking parents. For example there were 27 diagnoses of croup and 16 of these occurred in the non smoking group. Skin disease results were similar, 24 to 39, as were those of rubella and modified pertussis. No child in the survey died but a baby born to a family whose sibling was in the study died from Sudden Infant Death Syndrome. Both parents of this baby smoked.

Using chi square, all the data for the

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Table 1
Common diagnoses

Disease/health problem	Parent(s) smoking	Parents non smoking
Winter consultations	172	138
Spring consultations	107	82
Summer consultations	48	45
Autumn consultations	71	39
Respiratory diagnoses	216	154
Nervous and sense	104	63
Infectious disease	68	34
Preventive	40	26
URTI, pharyngitis	125	95
Otitis media	80	49
Gastroenteritis	37	17
Total diagnoses	502	372
Total consultations	398	306

URTI: upper respiratory tract infection

Table 2
Further diagnoses and health problems

Disease/health problem	Parent(s) smoking	Parents non smoking
Days in ACT hospitals	80	41
Wheezing on auscultation (total)	45	32
Wheezing on auscultation (initial)	28	17
Vaccinations	39	20
Conjunctivitis	15	7
Trauma	13	9
Tonsillitis	9	6
Scarlet fever	8	2

ACT: Australian Capital Territory

24 categories were studied — there were 2,243 observations for the smoking group and 1,614 for the non smoking. Chi square equalled 36.34 with 24 degrees of freedom and the probability level (p) equals 0.0509, which is almost significant at the five per cent level. However, there were five cells with expected frequencies less than five (these were for both groups in rubella, the non smoking group in scarlet fever and both groups in modified pertussis). If these rows are omitted chi square equals 34.91 with 22 degrees of freedom and p equals 0.0396 which is significant at the five per cent level. If the rows were combined then chi square equals 33 and p equals 0.0619 which is significant at the 10 per cent level.

The means of the diagnoses per patient over 18 months were calculated. *Figure 1* shows a greater mean of consultations (7.6 to 5.9) and diagnoses (9.6 to 7.1) for the children of smoking parents. Breaking consultations and diagnoses into age groups showed a continuing dominance of the smoking group in all ages except for age two to three years. *Figure 2* shows the breakdown of total consultations by season with smoking group dominance in all seasons but especially in autumn. Breaking down winter and spring consultations by age showed the smoking group again ahead in all ages, except for age two to three years. *Figure 3* compares the means of diagnoses per patient for the larger classifications of illnesses. The smoking mean was higher for respiratory (4.1 to 3.0), nervous and sense organ, infectious, preventive and accident groupings but not for skin disease. For the ICHPPC — 2 rubrics (*Figure 4*), the

The smoking group children had more diagnoses of respiratory disease, nervous and sense organ disease, trauma and infectious disease.

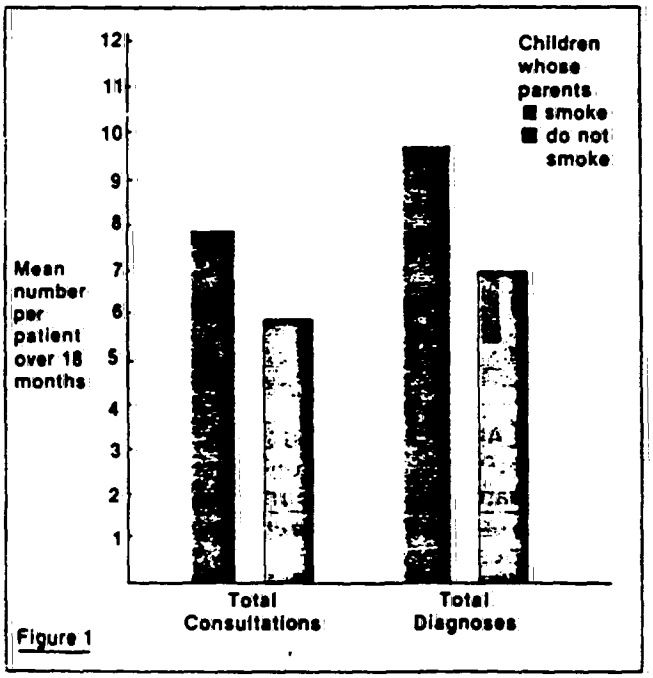

Figure 1

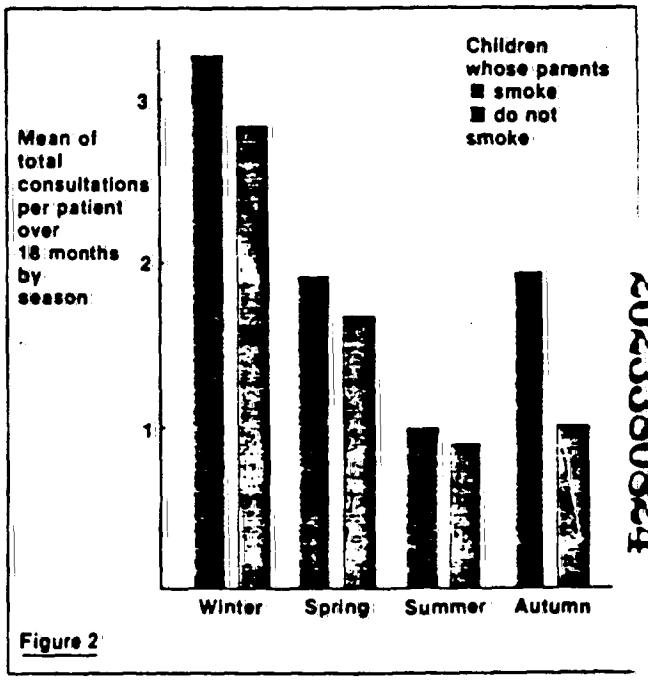

Figure 2

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means were URTI, pharyngitis (2.4 to 1.8), otitis media (1.5 to 0.9), vaccinations (0.8 to 0.4) and gastroenteritis (0.7 to 0.3). In each of these categories the smoking group showed more diagnoses.

Discussion

Parental anxiety was a variable which was not included in the matching procedure. It may have played an important role as smokers exhibit more neurotic symptoms than non smokers[16] and it may be this factor that drives the smoking parents to consult the doctor with their children. However, otitis media is an excellent tracer disease where one would expect parental anxiety to express itself equally in both groups.[11] There was a marked increase in attendance for otitis media in the smoking group. A more recent study by the author based on the same children, has shown a dose response relationship. This suggests an actual effect of sidestream smoke, possibly altering the IgE antibody on the eustachian tube mucosa, or the increase of upper respiratory infection.[12]

Respiratory disease diagnoses were seen more in the smoking group and include both upper and lower respiratory tract infections, pharyngitis, tonsillitis, scarlet fever and wheezing. These are similar findings to previous studies on the effects of smoking. The greater number of tonsillitis diagnoses in the smoking group correlate with another study which has demonstrated a higher rate of tonsillectomy in the children of smokers.[13]

Wheezing was a clinical measure[14] as airflow meters are difficult to use with young children. Other studies of older children have shown forced expiratory volume (FEV) changes directly related to the child's mother's smoking.[15, 16] By a seasonal analysis, respiratory disease dominated the smoking group, with the smallest difference between the groups occurring in summer, when, one assumes, children are outdoors more often and away from sidestream smoke.

The tracer disease otitis media was expected to express itself equally in both groups but it featured more prominently in the smoking group.

Gastroenteritis diagnoses were greater in the smoking group. Parental anxiety may be a factor here. Breast feeding has a protective effect and one asks, do breast feeders tend to be non smokers? Carbon monoxide poisoning can mimic gastroenteritis.[17]

Conjunctivitis diagnoses predominated in the smoking group. This finding is supported by another study which showed sidestream smoke as a cause of measurable physical change to the tear film.[18]

The mechanism of disease production from cigarette sidestream smoke is unknown. This smoke has higher concentrations of potentially noxious substances than that inhaled by the smoker. These include carbon monoxide and the carcinogens 3, 4-benzo (a) pyrine, ammonia and dimethylnitrosamine.[19, 20] It increases venous carboxyhaemoglobin, serum nicotine and thiocyanate.[21, 22] Cigarette smoke has 50 suspected carcinogens[23] and can affect mammalian tissue cultures.[24] It can trigger angina in the non smoking adult as well as significantly reducing forced expiratory flow by 25 to 75 per cent.[25]

The sample in this study had a similar general morbidity pattern to another group of children studied in a Newcastle practice several years ago.[26] Future studies should include the child minder's smoking habits as another variable and use tracers such as cotinine to detect the presence of 'passive' smoke. The study is limited to this sample and extrapolation of the findings cannot be made universally but they definitely indicate that further studies should be made. The age group involved (young children) constitutes an important part of primary

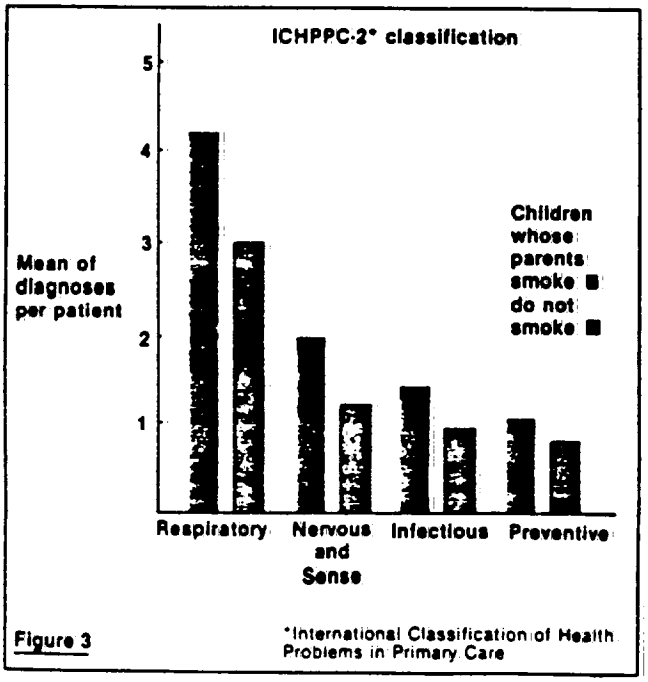

Figure 3

*International Classification of Health Problems in Primary Care

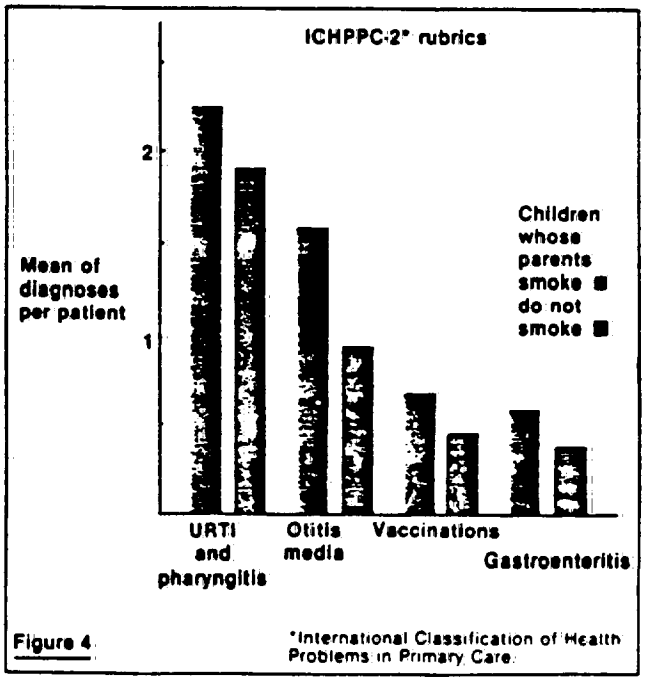

Figure 4

*International Classification of Health Problems in Primary Care

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ATIVAN* Prescribing Information

Composition Lorazepam.

Actions — A benzodiazepine derivative remotely related to chlordiazepoxide and diazepam, and closely related to oxazepam. It has a therapeutic equivalence in doses about one-fifth that of diazepam and one-twentieth of that of oxazepam and chlordiazepoxide. In humans, lorazepam has an antianxiety effect and relief of symptoms of both free floating and somatic anxiety has been demonstrated. An anticonvulsant effect has been confirmed but is yet to be delineated. An amnesic effect is seen at high dosage. No muscle relaxant property is seen in therapeutic dosage. Lorazepam has a sedative hypnotic effect at doses within the recommended therapeutic range, with low initial dosage and adjustment to individual response the anxiolytic effect may be separated from the sedative hypnotic.
Lorazepam is metabolised in the liver and excreted mainly in the urine, almost entirely as the glucuronide. Peak plasma levels of free drug are attained over one to six hours.

Indications — Emotionally induced autonomic symptoms such as headache, insomnia, gastrointestinal upsets, palpitation etc. Anxiety as a complicating factor in organic disease. (Lorazepam may be a valuable adjunct because of its compatibility with other medications in the treatment of conditions such as cardiovascular disease and peptic ulcer.) Symptomatic relief of anxiety and tension in psychoneurosis and anxiety reactions.
Note Lorazepam is not indicated in psychotic emotional reactions.

Contraindications — History of hypersensitivity to lorazepam or other benzodiazepines. Acute narrow angle glaucoma. (Lorazepam may be used in open angle glaucoma which is being treated appropriately.)
Use in children. Because of lack of sufficient clinical experience, use in children under 6 years of age is not recommended.

Precautions — Amnesia has been frequently reported after parenteral use of benzodiazepines; in a few susceptible individuals amnesia has been reported after oral dosage of lorazepam (3 mg) or diazepam (20 mg).
Patients should be warned against operating dangerous machinery or driving motor vehicles. Care should be taken to warn patients that their tolerance to alcohol or other CNS depressants may be lowered.
When therapy is no longer needed lorazepam dosage should be decreased gradually. Withdrawal symptoms have been reported after abrupt discontinuation of benzodiazepines especially after an extended period of high dosing.
Special care is needed in renal or hepatic dysfunction.
Use in pregnancy. Safety in pregnancy has not been established.
Use in lactation. In therapy of the breast feeding mother, lorazepam might be expected to appear in milk as do other benzodiazepines but no direct data are available.

Adverse Reactions — The commonest effects are CNS in origin and include sleepiness, drowsiness, dizziness, headache, nausea and vomiting. Other reactions are ataxia, depression, blurred vision, diplopia, dry mouth or hypersalivation, confusion, dysarthria, hypotension, incontinence, changes in libido, constipation, tremor, vertigo, skin rash.
Paradoxical reactions such as hyperexcitability, anxiety, hallucinations, increased muscle spasticity, insomnia, rage or sleep disturbances have been reported and are indications for the drug to be discontinued.
Benzodiazepines have been reported to cause isolated cases of neutropenia and/or jaundice; periodic blood counts and liver function tests are advisable during long-term therapy.

Interactions — Patients should be advised to abstain from alcohol and other CNS depressants. If the clinician desires to use combined therapy with other psychotropic or antidepressant drugs, consideration should be given to the pharmacology of the other agents, particularly with compounds known to potentiate its action such as phenothiazines, narcotics, barbiturates, MAO inhibitors and other antidepressants.

Overdosage — Treatment. Management of overdose is by general supportive measures along with gastric lavage. IV fluids should be given and an adequate airway maintained.

Dosage and Administration — *In mild to moderate anxiety (as seen in general practice)* 2 to 3 mg daily with a range up to 6 mg. The initial dose may be given at night to obviate drowsiness early in therapy. A twice daily regimen is often sufficient but some patients may need thrice daily dosage. The final dose is given preferably one hour before retiring. If insomnia is predominant, the bedtime dose may be twice that for the morning. Geriatric patients will probably respond to lower daily doses. *In the severely disturbed patient (as seen in psychiatric practice).* Doses of the order of 5 to 10 mg or more daily may be required.
For presurgical medication 2 to 4 mg of Ativan the night before and/or 1 to 2 hours before the operation or procedure.
Children. Initiate therapy with the lowest dose (no more than 0.5 mg) and increase as required. Ativan is not recommended for children under six years.

Presentation — Tablets, 1 mg (off white, scored, marked 1 mg, Wyeth logo on reverse), 50's; 2.5 mg (yellow, scored, marked 2.5 mg, Wyeth logo on reverse), 50's.

[redacted]

Wyeth Wyeth Pharmaceuticals Pty. Ltd.
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care in this country.[27] Many people, especially women, smoke at the time they begin their families and this group particularly should be encouraged by their general practitioners to give up smoking.[28]

Conclusion

There were differences between the smoking and non smoking groups in this sample and overall, they were great enough to be almost significant at the five per cent level. Upper and lower respiratory disease, conjunctivitis, otitis media, infectious disease and accidents featured more strongly in the smoking group. One would expect the tracer disease — otitis media — to express itself equally in both groups but in fact it featured more prominently in the smoking group. The smoking group consulted more and spent more days in hospital. Larger studies in a primary care setting are strongly recommended.

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